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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/550,209

09/21/2005

Akihiko Okada

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EXAMINER

BOHATY, ANDREW K

ART UNIT

PAPER NUMBER

1786

NOTIFICATION DATE

DELIVERY MODE

02/17/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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USPTO@SUGHRUE.COM

Office Action Summary	Application No. 10/550,209	Applicant(s) OKADA ET AL.	
	Examiner Andrew K. Bohaty	Art Unit 1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2009/11/30</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 30, 2009 has been entered.

2. This Office action is in response to the amendment filed November 30, 2009, which cancels claims 1-9 and adds claims 22 and 23. Claims 10-23 are pending.

Response to Amendment

3. Applicant's amendment of the claims and cancellation of the claims, filed November 30, 2009, has caused the withdrawal of the rejection of claims 1-9, 12, and 13 under 35 U.S.C. 102(e) as being anticipated by Uckert et al. (US 2004/0185302) as set forth in the Office action mailed October 30, 2008.

4. Applicant's amendment of the claims and cancellation of the claims, filed November 30, 2009, has caused the withdrawal of the rejection of claims 1-6, 9, 12, and 13 under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (6,107,452) in view of Bandodakar et al. (Synthesis, vol. 9, pp. 843-844, 1990) as set forth in the Office action mailed October 30, 2008.

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5. Applicant's amendment of the claims and cancellation of the claims, filed November 30, 2009, has caused the withdrawal of the rejection of claims 7 and 8 under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (6,107,452) in view of Bandodakar et al. (Synthesis, vol. 9, pp. 843-844, 1990) and Iyer et al. (Tetrahedron Letters, vol. 38, no. 49, pp. 8533-8536, 1997) as set forth in the Office action mailed October 30, 2008.

6. Applicant's amendment of the claims and cancellation of the claims, filed November 30, 2009, has caused the withdrawal of the rejection of claims 14-16 under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (6,107,452) in view of Bandodakar et al. (Synthesis, vol. 9, pp. 843-844, 1990) and Noguchi et al. (US 2002/0177687) as set forth in the Office action mailed October 30, 2008.

7. Applicant's amendment of the claims and cancellation of the claims, filed November 30, 2009, has caused the withdrawal of the rejection of claims 14-16 under 35 U.S.C. 103(a) as being unpatentable over Uckert et al. (US 2004/0185302) in view of Noguchi et al. (US 2002/0177687) as set forth in the Office action mailed October 30, 2008.

8. After further consideration of the prior art set forth in the rejection of claims 10 and 11 under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (6,107,452) in view of Bandodakar et al. (Synthesis, vol. 9, pp. 843-844, 1990) and Bozano et al. (Journal of Applied Physics, vol. 94, no. 5, pp. 3061-3068, 2003) as set forth in the Office action mailed October 30, 2008, the examiner has withdrawn the rejection of claims 10 and 11.

Response to Arguments

9. Applicant's arguments with respect to claims 10 and 11 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 11 and 17-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

12. Claim 11 recites the limitation "the polymer" in line 5. There is insufficient antecedent basis for this limitation in the claim. Before the limitation "the polymer" is used the applicant claims a polymer composition comprising two or more polymers and does not differ between the different polymers; therefore, it is unclear what polymer that applicant is referring to in the limitation "the polymer". It is unclear if the applicant means all the polymers or only one of the polymers. The examiner will interpret the claim as "the polymer" refers to only of the polymers in the polymer composition.

13. Claims 17-21 are rejection due to their dependence on claim 11.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. Claims 10-13, 17, 18, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uckert et al. (US 2004/0185302) (hereafter "Uckert") in view of Woo et al. (US 6,362,310) (hereafter "Woo").

17. Regarding claims 10, 11, 12, and 17, Uckert teaches a copolymer composed of poly(9,9-dialkylfluorenes). The polymer is synthesized by reacting 2,7-dibromo-9,9-dialkyl fluorene with bis (1,5-cyclooctadiene)nickel(0) (Ni(0) complex), 2,2'-bipyridyl, and 1,5-cyclooctadiene (200% by mole based on the total amount of monomer present (see example 1, paragraphs [0051]-[0052])). The polymer was not analyzed to determine what formed the terminal group of the polymer. However, given the fact that the polymer is prepared using a method nearly identical to applicant's method, it is the examiner's position that, absent evidence to the contrary, the polymer described would

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inherently have cyclooctadiene groups at the terminal ends of the polymer, since it is prepared using the same reagents. Uckert does not report the polystyrene reduced weight-average molecular weight of the polymer, but since it is produced by a method so similar to applicant's method, it would be predicted to have a similar molecular weight, and would meet the limitation of claims 10 and 11 especially given the claimed weight range of 100 to 100,000,000.

18. Uckert teaches that teaches polymers can be used in the light emitting layer of an electroluminescent device as a light emitting material (paragraphs [0065]-[0068]).

19. Uckert does not teach where the polymer is in a composition with other polymers.

20. Woo teaches a polymer light emitting device and teaches the light emitting layer can be composed of light emitting polyfluorenes (column 49 lines 29-42 and column 50 lines 26-34). Woo teaches that the polymer light emitting layer can be composed of a polymer blend of two or more polyfluorenes (column 18 lines 59-67 and column 19 1-3). Woo specifically teaches a polymer composed of 10% one polyfluorene and 90% of a different polyfluorene (Table 5 device D-9 and D-18). Woo teaches that using the polymer blends leads to an electroluminescent device with an improve efficiency (Table 5 compare D-8 and D-9).

21. It would have been obvious to one of ordinary skill in the art at the time the invention was made of to make the light emitting layer of Uckert a composition of both polymers taught by Uckert. The motivation would have been to increase the efficiency of the electroluminescent device.

22. Regarding claims 13 and 18, Uckert teaches the polymer is used as a light emitting material in the light emitting layer of an electroluminescent device, which is by definition, is a flat light source (see example 4, paragraphs [0065]-[0068]).

23. Regarding claims 22, Woo teaches the amount of one of the polymer only needs to be 10%, which is in the applicant's claimed range (Table 5 devices D-9 and D-18).

24. Regarding claim 23, Uckert teaches that both polymers (examples 1 and 3) are copolymers of different 9,9-dialkylfluorenes repeating units; therefore, both polymer are polyarylene based copolymers (paragraphs [0051] and [0061]).

25. Claims 14-16 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uckert et al. (US 2004/0185302) (hereafter "Uckert") in view of Woo et al. (US 6,362,310) (hereafter "Woo") as applied to claims 10-13, 17, 18, 22, and 23 above, and further in view of Noguchi et al. (US 2002/0177687) (hereafter "Noguchi").

26. Regarding claims 14-16 and 19-21, Uckert teaches electroluminescent devices are present in many different kinds of electronic equipment (paragraph [0004]). Uckert is silent on the types of electronic equipment.

27. Uckert in view of Woo does not teach where the electroluminescent device is used in a segment display, a dot matrix display, or in a backlight of a liquid crystal display.

28. Noguchi teaches electroluminescent devices, where the light emitting layer comprises a polymeric material (paragraph [0012]). Noguchi teaches the use of the

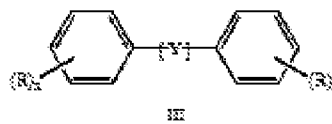
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electroluminescent device in a segment display, a dot matrix display or as a backlight in a liquid crystal display (paragraph [0013]).

29. It would have been obvious to one of ordinary skill in the art at the time the invention was made to try to use the electroluminescent devices of Uckert in view of Woo in a segment display, a dot matrix display, or in a backlight of a liquid crystal display as taught by Noguchi. Uckert teaches the electroluminescent devices can be used in a variety of different electronic equipment and Noguchi teaches a variety of different electronic equipment that polymeric electroluminescent devices can be used in. Given these teaching it would have been obvious to try to use the electroluminescent device of Uckert in view of Woo in a segment display, a dot matrix display, or in a backlight of a liquid crystal display with a predictable expectation of success.

30. Claims 10-13, 17, 18, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US 6,107,452) (hereafter "Miller") in view of Bozano et al. (Journal of Applied Physics 2003, 94, 3061-3068) (hereafter "Bozano"), Lee et al. (US 6,200,731) (hereafter "Lee") and Wolk et al. (WO 03/017732) (hereafter "Wolk").

31. Regarding claims 10, 11, 12, and 17, Miller teaches polymers where the terminal of the polymer is functionalized by a functional group that is thermally or photochemically polymerizable (column 1 lines 56-60 and column 7 lines 13-14). Miller



teaches that the polymer meets the following formula, , where R is the reactive terminal group and Y is the repeating monomer unit (column 5 lines 15-

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30). Miller teaches that the repeating monomer unit can be one type of repeating unit or two of more types of repeating units, making a copolymer (column 10 line 45 and column 11 line 40). Miller teaches the monomer unit can be a light emitting repeating unit, a hole transporting repeating unit, or an electron transporting repeating unit (column 6 lines 32-67). Miller teaches that the reactive groups can be any polymerizable groups known to one of ordinary skill in the art that allows the group to be polymerized under thermal or photochemical conditions (column 7 lines 51-54).

32. Miller further teaches that the molecular weights of the polymers to be 3000 or 5000 (column 10 line 67, column 11 line 29 and lines 62-63).

33. Miller teaches the polymers can be used in the light emitting of an electroluminescent device (column 11 lines 65-67 and column 12 lines 1-60).

34. Miller does not teach where the reactive group is not bound directly to the repeating unit, the polymer is comprised in a composition of two or more fluorescent polymers, and Miller does not teach where the reactive group is an alicyclic hydrocarbon group containing an unsaturated bond and being optionally substituted by a acyclic hydrocarbon group.

35. Bozano teaches electroluminescent devices, based on crosslinked polymer blends (page 3061 abstract). Bozano uses similar polymers to those as described by Miller, where two polymers are blended together in a single composition (see table 1, page 3063). Bozano teaches that using crosslinkable polymer blends produces a mixture which is resistant to phase segregation, and produces stable polymer blends (page 3061 second and third paragraphs on the page).

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36. Lee teaches norbornene as a polymerizable group that can be used to crosslink a polymer chain (column 4 lines 25-57). Norbornene is an alicyclic hydrocarbon group.

37. Wolk teaches that crosslinking groups can be directly attached to the monomer unit and not through a phenyl group (page 11 line 19 through page 12 line 16).

38. It would have been obvious to one of ordinary skill in the art at the time the invention was made to try to make the polymers of Miller, so the reactive group was attached directly to the repeating unit and not through a phenyl group and the reactive group was norbornene. Miller teaches that the polymers comprise reactive groups can be used to crosslink the polymers and Lee teaches the use of norbornene as an alicyclic hydrocarbon crosslinking group and Wolk teaches that the reactive group can be attached directly to the monomer group. The teaching of Lee and Wolk show that it was known in the art at the time the invention was made that reactive crosslinking groups can be attached directly to the monomer group and the crosslinking group can be norbornene; therefore, ability of the modified polymer of Miller to crosslink would have been predictable.

39. Furthermore, it would have been obvious to one of ordinary skill in the art to make blends of the polymers of Miller and use the composition to make the light emitting layer in the electroluminescent device and crosslink the polymers together.

The motivation to make crosslinkable blends would have been to make blends that are resistant to phase segregation and produce stable polymer blends.

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40. Regarding claims 13 and 18, Miller teaches the polymer is used as a light emitting material in the light emitting layer of an electroluminescent device, which is by definition, is a flat light source (column 11 lines 65-67 and column 12 lines 1-60).

41. Regarding claim 22, Bozano teaches that the ratio of one of polymers can range from 5 to 60% by weight based on the total amount of the polymer composition (page 3063 Table 1).

42. Regarding claim 23, Miller teaches the polymers can be copolymers and all of the polymers of Miller are polyarylene bases (column 6 lines 32-67, column 7 lines 1-12, and column 11 line 40).

43. Claims 14-16 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US 6,107,452) (hereafter "Miller") in view of Bozano et al. (Journal of Applied Physics 2003, 94, 3061-3068) (hereafter "Bozano"), Lee et al. (US 6,200,731) (hereafter "Lee") and Wolk et al. (WO 03/017732) (hereafter "Wolk") as applied to claims 10-13, 17, 18, 22, and 23 above, and further in view of Noguchi et al. (US 2002/0177687) (hereafter "Noguchi").

44. Regarding claims 14-16 and 19-21, Miller teaches electroluminescent devices are present in many different kinds of electronic devices (column 1 lines 8-13). Miller is silent on the types of electronic device.

45. Miller in view of Bozano, Lee, and Wolk does not teach where the electroluminescent device is used in a segment display, a dot matrix display, or in a backlight of a liquid crystal display.

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46. Noguchi teaches electroluminescent devices, where the light emitting layer comprises a polymeric material (paragraph [0012]). Noguchi teaches the use of the electroluminescent device in a segment display, a dot matrix display or as a backlight in a liquid crystal display (paragraph [0013]).

47. It would have been obvious to one of ordinary skill in the art at the time the invention was made to try to use the electroluminescent devices of Miller in view of Bozano, Lee, and Wolk in a segment display, a dot matrix display, or in a backlight of a liquid crystal display as taught by Noguchi. Miller teaches the electroluminescent devices can be used in a variety of different electronic devices and Noguchi teaches a variety of different electronic devices that polymeric electroluminescent devices can be used in. Given these teaching it would have been obvious to try to use the electroluminescent device of Miller in view of Bozano, Lee, and Wolk in a segment display, a dot matrix display, or in a backlight of a liquid crystal display with a predictable expectation of success.

Conclusion

48. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew K. Bohaty whose telephone number is (571)270-1148. The examiner can normally be reached on Monday through Thursday 7:30 am to 5:00 pm EST and every other Friday from 7:30 am to 4 pm EST.

49. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on (571)272-1515. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

50. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A Chriss/
Primary Examiner, Art Unit 1786

/A. K. B./
Andrew K. Bohaty
Examiner, Art Unit 1786